1 528 915

PATENT SPECIFICATION (11) 1 528 915

(21) Application No. 50595/74 (22) Filed 21 Nov. 1974 (19)

(23) Complete Specification filed 26 Nov. 1975

(44) Complete Specification published 18 Oct. 1978

(51) INT. CL.² B62K 11/02

(52) Index at acceptance
B7E 41

(54) IMPROVEMENTS IN OR RELATING TO MOTORCYCLE FRAMES

(71) We, ANTHONY DAWSON, a British subject of 49 Harrison Road, Sheffield, S6 4NA, and GUY ALEXANDER HARMSWORTH, a British subject of 20 Aubrey Road, London, W.8, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to motor cycles and is particularly concerned with a frame for motor-cycles.

Traditionally, a motor cycle frame has been formed from metal tubes, suitably bent and welded together in such a manner as to facilitate the location of the major components of the motor cycle, e.g., the front and rear forks, the engine and the petrol tank. The bending and welding of tubes is a task that requires a high degree of skill on the part of the operative, and is a time consuming and relatively expensive procedure. Also, the frame must be purpose built for one particular motorcycle, and cannot readily accept engines of different makes, shapes or size, nor can it readily allow alteration of the geometry of front or rear forks—important points for motorcycles intended for any of the forms of motor cycle sport when ready adjustment, or substitution o fone major component by another more suited to the particular prevailing conditions, would be highly advantageous.

in substantially parallel spaced relationship, said substantially flat plates having integral forward sections for the direct releasable mounting of a front wheel steering head, integral rearward sections of the releasable mounting of a rear wheel suspension, and integral downward sections for the releasable mounting of an engine. Preferably the two substantially flat plates are identical whereby each plate can serve as a left hand or right hand frame member.

By replacing the known tubular construction by two substantially flat plates releasably secured together in spaced and parallel relationship, the task of producing the frame is considerably simplified by substantially reducing the need to effect any bending and eliminating welding steps. The substantially flat plates themselves can readily be produced of an appropriate shape by any conventional cutting or stamping technique from, e.g. high strength, low weight aluminium alloy, or synthetic plastics material and can simply be secured together, e.g., by a number of spacers secured between the plates by bolts passing through holes in the plates. It will therefore be readily appreciated that not only is initial construction simplified, but also the repair of any damage to the frame either by the straightening of a bent plate or its complete replacement.

By having two spaced substantially flat plates, they can be spaced apart by any

SPECIFICATION NO 1528915

Inventor: ANTHONY DAWSON

By a further direction given under Section 17 (1) of the Patents Act 1949 this application pro[ceeds] in the name of DAWSON HARMSWORTH LIMITED, a British Company, of 401-405 Penistone Road, [Sheffield] England.

THE PATENT OFFICE

PATEN SPECIFICATION (11) 1[illegible]915

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Traditionally, a motor cycle frame has been formed from metal tubes, suitably bent and welded together in such a manner as to facilitate the location of the major components of the motor cycle, e.g., the front and rear forks, the engine and the petrol tank. The bending and welding of tubes is a task that requires a high degree of skill on the part of the operative, and is a time consuming and relatively expensive procedure. Also, the frame must be purpose built for one particular motorcycle, and cannot readily accept engines of different makes, shapes or size, nor can it readily allow alteration of the geometry of front or rear forks—important points for motorcycles intended for any of the forms of motor cycle sport when ready adjustment, or substitution o fone major component by another more suited to the particular prevailing conditions, would be highly advantageous.

In addition to the above, should a motor cycle be involved in a collision, damage to the frame can easily result in the need to replace the whole frame thus adding considerably to the cost of repair if indeed repair is deemed possible in the light of the cost of replacement frames.

The object of the present invention is to provide a frame for a motor cycle of considerably simplified form than the tubular frames known hitherto, which allows ready replacement of the major components on the frame of the motor cycle, and which allows repair to the frame hitherto not possible.

According to the present invention, a motor cycle frame comprises two substantially flat plates releasably secured together in substantially parallel spaced relationship, said substantially flat plates having integral forward sections for the direct releasable mounting of a front wheel steering head, integral rearward sections of the releasable mounting of a rear wheel suspension, and integral downward sections for the releasable mounting of an engine. Preferably the two substantially flat plates are identical whereby each plate can serve as a left hand or right hand frame member.

By replacing the known tubular construction by two substantially flat plates releasably secured together in spaced and parallel relationship, the task of producing the frame is considerably simplified by substantially reducing the need to effect any bending and eliminating welding steps. The substantially flat plates themselves can readily be produced of an appropriate shape by any conventional cutting or stamping technique from, e.g. high strength, low weight aluminium alloy, or synthetic plastics material and can simply be secured together, e.g., by a number of spacers secured between the plates by bolts passing through holes in the plates. It will therefore be readily appreciated that not only is initial construction simplified, but also the repair of any damage to the frame either by the straightening of a bent plate or its complete replacement.

By having two spaced substantially flat plates, they can be spaced apart by any desired distance to suit the major components of the motor cycle. To allow ready substitution of one engine for another, it is preferred to provide auxiliary plates with several spacing or distance pieces to allow the auxiliary plates to be set at any desired spacing from each other whilst keeping the main substantially flat plates at a constant spacing from each other, whereby one of several different engines can readily be secured to the frame.

It is usual to predetermine the angle of inclination of the front fork and to rigidly secure the steering head which receives the fork to the frame. It is, however, recognised that different angles of inclination are required for optimum performance under different conditions. With a frame constructed

in accordance with the invention the steering head is removably secured between the substantially flat plate whereby in simple manner one steering head may be removed and replaced by another to allow adjustment of the angle of inclination of the front fork. Alternatively, the steering head may be adjustably mounted between the substantially flat plates whereby the desired angle of inclination of the front fork can be selected from the range provided by the available adjustment.

Rear-fork members may be pivotally secured, either one to each substantially flat plate or preferably to a pivot pin passing through these plates, and any suitable spring or damping member can be provided releasably secured at a convenient point to the rearward sections o fthe substantially flat plates and to the rear-fork members. It may, however, be necessary to splay the rearward section of the substantially flat plates to accommodate varied widths of spring or damping member.

A petrol tank may be mounted on the substantially flat plates in conventional manner, i.e., with a recess in its lower face into which the plates fit. For some purposes, however, the frame of the invention allows the siting of the tank between the plates frame members with consequent reduction in width of the motor cycle which can be distinctly advantageous, and when a metal or moulded plastic cover for the frame may be provided for comport and appearance.

The invention, as applied to a motor cycle for normal road use, therefore provides a frame which by virtue of its construction from two substantially flat plates releasably secured together allows greatly simplified manufacturing techniques and is therefore eminently suited to mass production utilising unskilled or semi-skilled labour for the actual assembly of the frame and the major components on the frame, with the effect of this on production costs, and greatly facilitates the repair of such motor cycles. For more specialised motor cycles such as for road and track racing, the invention allows the rider to determine, when the conditions are known, factors such as engine type and front fork angular disposition required, and effectively purpose build the motor cycle in these essential respects in a simple manner not possible with conventional frames.

One embodiment of the invention will now be described by way of example with reference to the accompanying drawings, in which

Figure 1 is an exploded perspective view of a motor cycle frame according to the invention;

Figure 2 is a side elevation of the frame of Figure 1;

Figure 3 is a front elevation of the frame of Figure 1;

Figure 4 is a plan of the frame of Figure 1; and

Figure 5 is an enlarged view of a spacing or distance piece for use with the frame of Figures 1 to 3.

In the drawings, a frame 1 for a motor cycle is formed by two substantially flat plates 2 releasably secured together in spaced parallel relationship by spacers or distance pieces 3 which, are formed by sleeves 4 having internally screw-threaded end portions 5 to receive respective externally threaded portions 6 of bolts 7 each terminating in a head 8. Thus, with the sleeves 4 lying between the plates 2, and portions 6 passing through appropriate holes in the plates, the plates are clamped between the bolt heads 8 and the ends of the sleeves 4. By providing a number of sleeves 4 and bolts 7, the plates 2 are rigidly held together and correctly spaced from each other, to provide a motor-cycle frame, and yet can readily be dismantled should the need arise.

To provide for the mounting on the frame 1 of the major components of the motor cycle, the plates 2 are each so shaped as to provide a forward section 9, a downward section 10 and a rearward section 11. Between the forward sections 9, a steering head 12 is secured by bolts 13 passing through the plates 2, the steering head 12 being so oriented that the axis of the hole 14 through it (and through which the pivot stem of a front fork, not shown, passes) sets the angle of inclination of the front fork. Because of the need to alter the fork angle in certain circumstances (as has been discussed previously) it is a relatively simple matter to remove the bolts 13 and the steering head 12, and to replace it by another steering head the hole 14 of which has an axis of a different angle thereby to provide an alternative fork angle known to be more suited to the particular purpose for which the cycle is, to be used and the prevailing ground conditions. Alternatively, the steering head 12 may be adjustably mounted between the plates whereby the front fork angle can be adjusted as may be required.

As shown, the steering head 12 is integral with a strut 15 extending downwardly and which strut assists in securing an engine 16 in place. It will however be recognised that the strut 15 may be separated from the steering head 12, and suitably secured by its upper end between the forward extensions 9 of the plates 2.

The downward sections 10 of the plates 2 may themselves serve to secure the engine 16 in place, but, as shown, it is preferred to provide two auxiliary plates 17, each secured externally of and in spaced relationship to the respective section 10. Thus, two sleeves

4 are provided between the downward sections 10, and further sleeves 18 are provided between the plates 2 and the respective auxiliary plates 17, bolts 19 passing through holes in the auxiliary plates, the sleeves 18, the plates 2 and into the sleeves 4 to secure the plates 2 and the auxiliary plates 17 together. By providing the auxiliary plates 17 of an appropriate shape to suit a particular engine, the engine can readily be removably secured between the plates 17 by bolts 20 passing through holes in the plates 17 and into the engine moonting block. When an engine needs to be removed (for repair or replacement) disconnection of the engine is very easily effected, and when an engine needs to be replaced by a different make or size of engine more suited to the purpose for which the motor cycle is to be used or more suited to prevailing ground conditions, the auxiliary plates can simply be removed by removing the bolts 19 and replaced by other auxiliary plates of an appropriate shape to suit the replacement engine.

The rearward extensions 11 of the plates 2 serve the two-fold purpose of providing support for a seat 21 and for locating at a convenient point by pivots 22 spring or hydraulic damping members 23, the damping members 23 each extending and being pivotally secured at 24 to one of a pair of rear fork members 25. The rear fork members 25 are themselves pivotally secured at 26 to a respective auxiliary plate 17. To ensure sufficient clearance between the damping members and a wheel secured in the rear fork, the rearward extensions 11 of the plates 2 are splayed outwardly such that at their ends, the width between the rearward extensions corresponds to the width between the rear fork members 25.

A petrol tank 27 (indicated in Figure 1) may be sited between the plates 2, and passageways through the tank would then be provided for the sleeves 4. In this case, as metal or moulded plastics cover for the frame can be provided to enhance rider comfort and appearance. Alternatively, a petrol tank of conventional construction may be provided with a recess in its lower face into which the plates 2 fit.

The space between the plates 2 may also be utilised to house other necessary items such as a battery, fuse box, ignition system and electrical wiring with other items such as the mudguards and lights being suitably secured to the front and rear extensions 9 and 11 of the plates 2.

The plates 2 and auxiliary plates 17 may be formed from any suitable material advantageously combining the two features of high strength and low weight. Thus a suitable aluminium alloy is preferred although other materials such as a suitable synthetic plastics material may be employed. To further lighten the construction, holes 28 may be formed in the plates 2 during stamping or cutting of the plates.

WHAT WE CLAIM IS:—

1. A motor cycle frame comprising two substantially flat plates releasably secured together in substantially parallel spaced relationship, said substantially flat plates having integral forward sections for the direct releasable mounting of a front wheel steering head, integral rearward sections for the releasable mounting of a rear wheel suspension, and integral downward sections for the releasable mounting of an engine.

2. A frame as in Claim 1, wherein the two substantially flat plates are identical whereby each plate can serve as a left hand or right hand frame member.

3. A frame as in Claim 1 or Claim 2, wherein the substantially flat plates are secured together by a number of spacers secured between the plates by bolts passing through holes in the plates.

4. A frame as in any of Claims 1 to 3, wherein the front wheel steering head is adjustably secured between the forward sections of the substantially flat plates.

5. A frame as in any of Claims 1 to 4, wherein auxiliary plates are removably secured to the downward sections of the substantially flat plates, the engine being removably secured between the auxiliary plates.

6. A frame as in Claim 5 wherein several spacing or distance pieces are provided to allow the auxiliary plates to be set at any desired spacing from each other whilst keeping the substantially flat plates at a constant spacing from each other whereby one of several different engines can readily be secured to the frame.

7. A frame as in any of Claims 1—6, wherein rear-fork members are secured either one to each substantially flat plate or preferably to a pivot pin passing through the substantially flat plates.

8. A frame as in Claim 5 and Claim 7 when appended to Claim 5, wherein rear-fork members are pivotally secured to the auxiliary plate members.

9. A frame as in any of Claims 1 to 7 wherein spring or damping members of the rear wheel suspension are secured to the rearward sections of the substantially flat plates and on the rear-fork members.

10. A frame as in Claim 9 wherein the spring or damping members are pivotally secured to the rearward sections of the substantially flat plates and the rear-fork members.

11. A frame as in Claim 9 or Claim 10, wherein the rearward sections of the sub-

stantially flat plates are splayed outwardly to accommodate varied widths of spring or damping members.

12. A frame as in any of Claims 1 to 11 wherein the steering head is integral with a downwardly extending engine support strut.

13. A motor cycle frame substantially as herein before described with reference to the accompanying drawings.

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Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon) Ltd.—1978.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,
from which copies may be obtained.

1528915 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 1

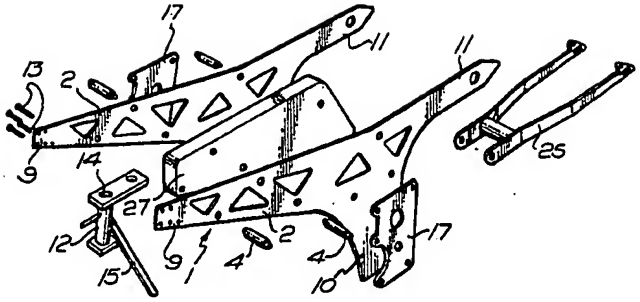

FIG. 1

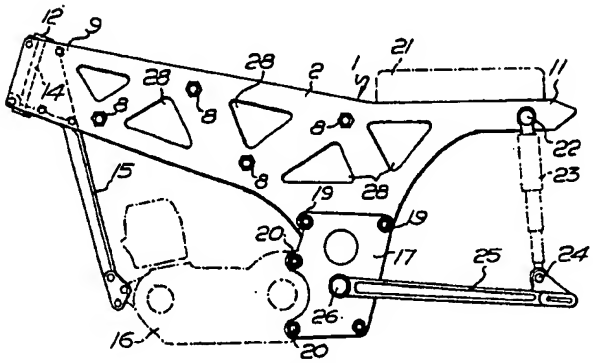

FIG. 2

1528915 COMPLETE SP. ICATION
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Sheet 2

FIG.3

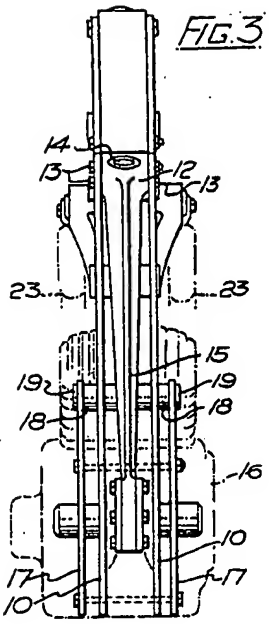

FIG.4

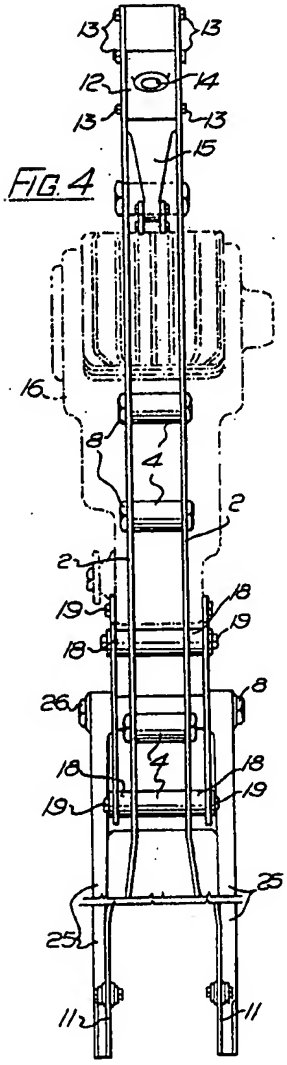

FIG.5